Surgery for predominant lesion in nonlocalized bronchiectasis

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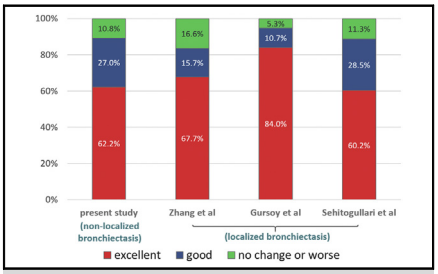
ABSTRACT

Objective: Patients with nonlocalized bronchiectasis are encountered commonly; however, there is little information regarding surgical intervention in this patient population. The aim of this study was to evaluate symptomatic response and safety of anatomic resection of the predominant lesion via the use of lobectomy for the management of nonlocalized bronchiectasis.

Methods: We reviewed the medical records of 37 consecutive patients who underwent lobectomy via thoracotomy for nonlocalized bronchiectasis between 2010 and 2013. The main surgical indications were nonlocalized bronchiectasis with one predominant lesion, failure of medical treatment, and adequate cardiopulmonary reserve. The predominant lesion was determined by preoperative computed tomography and/or bronchoscopy. Preoperative symptoms were compared with postoperative symptoms and analyzed by the use of paired techniques.

Results: The mean patient age was 54.5 ± 6.4 years. There was no operative mortality. Postoperative complications occurred in 8 (21.6%) patients, including 1 with empyema, 1 with persistent air leak, and 6 with minor transient complications, all of which were manageable without any reoperation. After lobectomy, the median extent of residual bronchiectatic areas in the remaining lungs was 25% (range, 12.5%-42.9%). The frequency of acute infection (5.3 ± 2.1/year vs 1.8 ± 2.3/year) and hemoptysis (4.9 ± 2.8/year vs 1.1 ± 0.7/year) decreased significantly and the amount of sputum also decreased (37.1 ± 3.4 mL/day vs 10.7 ± 4.6 mL/day). Twenty-three (62.2%) patients were asymptomatic after surgery, 10 (27.0%) were symptomatic with clinical improvement, and 4 (10.8%) had no change or worsened.

Conclusions: Lobectomy for the predominant lesion is a safe procedure in the surgical treatment of nonlocalized bronchiectasis and leads to significant relief of symptoms with good rates of satisfaction. (J Thorac Cardiovasc Surg 2016;■:1-7)



Patient satisfaction after surgery.

Central Message

Lobectomy for the predominant lesion in nonlocalized bronchiectasis can improve symptoms significantly with comparable satisfaction rates with localized bronchiectasis.

Perspective

Nonlocalized bronchiectasis is common. This study investigates the safety of lobectomy for predominant lesion in nonlocalized bronchiectasis and finds no operative mortality and an acceptable morbidity rate. Patients experience significant symptom improvement, and most are satisfied with the outcome. Lobectomy can be considered in selected patients whose symptoms are not controlled by medical therapy.

THOR

Bronchiectasis is defined as an abnormal and irreversible dilatation of the bronchi, often associated with chronic productive cough, airway obstruction, and recurrent infections.[1] Although the prevalence of bronchiectasis is not well characterized (from 3.7 to 52 per 100,000 adults[2]), it has become a major medical concern in developing countries, such as China.[3-5]

The role of surgical intervention in localized bronchiectasis has been well established,[2,6] and indications for surgery include failure of medical treatment, hemoptysis, and progressive disease with recurrent infections.[7]

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Abbreviation and Acronym
CT = computed tomography

Complete resection is pivotal in preventing postoperative infectious complications and disease recurrence.[8,9] Therefore, surgery has not been considered traditionally for nonlocalized bronchiectasis.

In patients with nonlocalized bronchiectasis in whom symptoms are not controlled by conservative medical therapy, however, the role of surgical resection for the predominant lesion should be re-examined. In our center, 37 patients with nonlocalized bronchiectasis received this therapeutic option. Surgery was indicated for patients with nonlocalized bronchiectasis provided that (1) patient symptoms persisted despite appropriate medical treatment, (2) the most affected area (ie, the predominant lesion) could be identified, and (3) cardiopulmonary function was compatible with the anesthetic risk. In this study, we aimed to evaluate symptomatic response and safety of anatomic resection of the predominant lesion by using lobectomy for the management of nonlocalized bronchiectasis.

MATERIALS AND METHODS

Study Population

This study was approved by the review board of Tongji University. Written informed consent was obtained from all patients. Nonlocalized bronchiectasis was defined as the bronchiectatic areas involving multiple segments and lobes.[10] Patients who had bronchiectasis with cystic fibrosis, bronchiectasis combined with aspergilloma, and surgery for emergency reasons were excluded from this study. We reviewed the medical records of 37 patients with nonlocalized bronchiectasis who underwent lobectomy for the predominant lesion in our department between January 2010 and December 2013.

The initial diagnosis of bronchiectasis was based on detailed patient medical records and documented bronchial wall dilatation on thoracic computed tomography (CT). All patients received standard medical treatment before operation, including systemic antibiotics, nonirritant expectorants, and anti-inflammatory agents according to our previous experience.[4] Failure of medical treatment was defined as frequent exacerbation interfering with normal professional or social life or requiring multiple hospitalizations.[4] The predominant lesion was located in the most severely affected area on CT scan (Figure 1), or in the area involved in hemoptysis through bronchoscopic examination. Surgical resection was not considered for patients with diffuse bronchiectasis. A predicted forced expiratory volume in 1 second of greater than 60% was considered adequate for surgery.

Preoperative Evaluation

Details of patient preoperative evaluation have been reported in previous publications.[3,4,11] To summarize, thoracic CT was performed to locate the predominant lesion. The extent of bronchiectatic lesions that was expected to be left behind was expressed as a proportion of the remaining lungs, which was calculated by the anatomic method, where the total number of segments for both lungs was deemed 19 (10 in the right lung and 9 in the left lung).[12] Bronchoscopy was used for the assessment of endobronchial membrane (excluding proximal obstruction), characterization of mycobacterial colonization, and for removal of secretions. The side opposite the predominant lesion should be examined first to minimize any potential contamination. For patients with compromised pulmonary function, quantitative pulmonary ventilation and perfusion scan was performed to estimate the postoperative lung function for operative consideration. Empiric antibiotic treatment was given with cephalosporin for a minimum of 48 hours before the operation if patients were not receiving antibiotic treatment. For those who were taking antibiotics, the regimen was continued in the perioperative setting. Patients were instructed by our nurses to collect their daily sputum in a given cup and to estimate the volume visually. They were prepared strictly at least 2 weeks until the daily sputum volume was less than 20 mL. For patients who failed to reach this threshold, a repeat sputum culture was performed, and antibiotics were modified subsequently on the basis of antibiotic sensitivity results.[2] Combination antibiotics were administrated if required. Additional medical treatment, such as anti-inflammatory medication and chest physiology therapy, was provided by a multidisciplinary team involving pulmonary and infectious disease consultants.

Surgical Technique

Posterolateral thoracotomy was performed in all patients. A double-lumen endotracheal tube was used to avoid the intraoperative contamination of the opposite side of the lung. Lobectomy was performed to remove the predominant lesion, including right upper lobectomy in 7 patients, right middle lobectomy in 9, right lower lobectomy in 5, left upper lobectomy in 6, and left lower lobectomy in 10. The minor lesions, which resided ipsilaterally in 2 patients and contralaterally in 35, were left untouched during the operation (Figure 2). Excessive bronchial dissection was avoided, and peribronchial tissues were preserved. Extrapleural dissection was performed to avoid spillage of lung content into pleural space. The order in the treatment of the hilum of lung was from pulmonary artery to pulmonary vein and then to the bronchus. Distorted bronchial arteries were isolated carefully and ligated or severed by ultrasonic device. The bronchial stump was closed with a mechanical stapler and reinforced with an intercostal muscle flap in 16 cases and a pedicled parietal pleural flap in 21 cases (Figure E1). After lobectomy, careful hemostasis was performed, and, if any early signs of

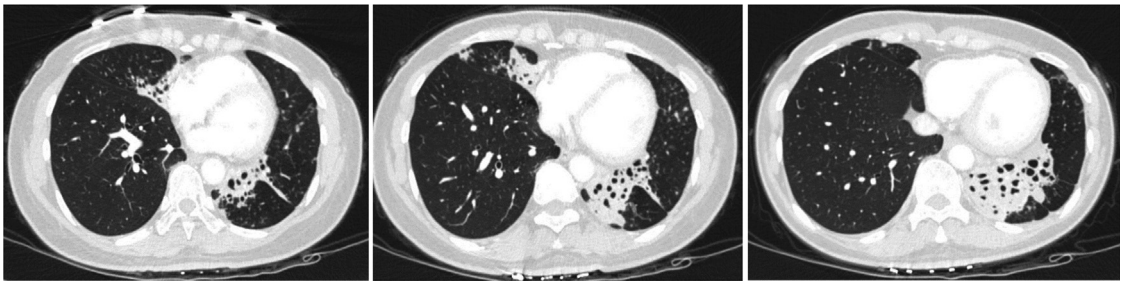

FIGURE 1. A 55-year old male patient suffered from bilateral bronchiectasis. The predominant lesion in the left lower lobe, the minor one in the right middle lobe, and some scattered lesions in both sides.